

PATENT COOPERATION TREATY

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From the
INTERNATIONAL SEARCHING AUTHORITY

To:

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WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/IB2004/051123

International filing date (day/month/year)
05.07.2004

Priority date (day/month/year)
11.07.2003

International Patent Classification (IPC) or both national classification and IPC
G09G3/34

Applicant
KONINKLIJKE PHILIPS ELECTRONICS N.V.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the International application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/B2004/051123

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/IB2004/051123

Box No. V Reasoned statement under Rule 43b/s.1(a)(I) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-11
	No: Claims	
Inventive step (IS)	Yes: Claims	7
	No: Claims	1-6, 8-11
Industrial applicability (IA)	Yes: Claims	1-11
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Reference is made to the following documents:
D1: EP-A-1 286 326 (SEIKO EPSON CORP) 26 February 2003 (2003-02-26)
D2: US-A-5 912 712 (DOHERTY DONALD B) 15 June 1999 (1999-06-15)
D3: US 2003/010894 A1 (BETSUI KEIICHI ET AL) 16 January 2003 (2003-01-16)
D4: WO 03/038512 A (SIPIX IMAGING INC) 8 May 2003 (2003-05-08)
D5: ROBERT ZEHNER 1 ET AL: "20.2: Drive Waveforms for Active Matrix Electrophoretic Displays" SID, vol. XXXIV, 23 May 2003 (2003-05-23), pages 842-845, XP007008253
2. **Lack of inventive step**
The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1-6 and 8-11 does not involve an inventive step in the sense of Article 33(3) PCT.
 - 2.1 The following features of **claim 1** are known in combination from the closest prior art document D1 (the references in parentheses applying to this document):

An electrophoretic display unit (par. 1 and the display device 1 in Fig. 2) comprising:
 - an electrophoretic display panel (the pixel unit 2A in Figs. 2 and 5) comprising lines (directly apparent from Fig. 5) with pixels (par. 44 and directly apparent from Fig. 5);
 - a line driver (pars. 36/44, the circuits 2B/66-69 in Figs. 2/5) for driving the lines;
 - a controller (par. 35, the controller 4 in Fig. 2) for supplying a line driving signal having a timing parameter to the line driver (pars. 48, 49, 52 and Fig. 2).
 - 2.2 The subject-matter of claim 1 differs from the device according to D1 in that the controller is adapted to vary a timing parameter for varying the frame rate of the display, whereas in D1 the frame rate is fixed (par. 48).
 - 2.3 Hereby the following object is addressed: To allow the use of the display in a system that receives display data with varying frame rates (cf. D2, c. 1, l. 11-15).

- 2.4 However, the use of display controller being able to handle a range of frame rates (cf. D2, the abstract and c. 1, l. 11-15 and 34-46) is known to offer the advantage to allow the use of a display in a system that receives display data with varying frame rates (cf. D2, c. 1, l. 11-15). It would therefore be obvious to the person skilled in the art, to apply a display controller according to document D2 to an electrophoretic display unit according to D1, thus arriving at an electrophoretic display unit according to claim 1. Consequently, the subject-matter of claim 1 does not involve an inventive step.
- 2.5 Furthermore, the document D3 discloses a display device and teaches (par. 8 and 48-50) how to reduce colour break without considerably changing the power consumption by using a display controller adapted to vary a timing parameter for varying the frame rate of the display. The skilled person would consider applying this teaching to an electrophoretic display unit according to D1, thus arriving at an electrophoretic display unit according to claim 1. Consequently, also a combination of the documents D1 and D3 renders the subject-matter of claim 1 obvious.
- 2.6 The independent method **claim 9** defines the method which corresponds to the apparatus claim 1. The application of a device according to claim 1 which is rendered obvious by a combination of D1 and either of D2 or D3 implies the steps of the method according to claim 9. Consequently, the features of claim 9 do not involve an inventive step either.
- 2.7 Independent **claim 10** defines a computer program product for executing the steps of the method of claim 9. However, the subject-matter of claim 9 does not involve an inventive step because it is common practice to store the steps of an obvious method as a computer program product.
- 2.8 Independent **claim 11** defines a display controller which is already defined in the display unit of claim 1. Consequently, the scope of claim 11 is broader than the scope of claim 1 and thus the subject-matter of claim 11 does not involve an inventive step for the reasons given in items 2.1 - 2.5 above.
- 2.9 Also the features of the dependent claims 2-6 and 8 are rendered obvious by a combination of document D1 with either of D2 or D3.

- 2.10 **Claim 2:** The timing parameter is formed by a delay of a start of the line driving signal: Cf. D2, c. 6, l. 4-14, dropping a clock count results in a delay of the timing signal; or cf. D3, par. 58, adjustment of the timing results in a delay of the timing signal.
- 2.11 **Claim 3:** The timing parameter is formed by a duration of a line driving signal of a line: Cf. D3, par. 54, the control signal CS.
- 2.12 **Claim 4:** The timing parameter corresponds with a product of a predefined time-interval and a step value defined by a number of bits: Cf. D2, c. 3, l. 66 - c. 4, l. 9.
- 2.13 **Claim 5:** A line corresponds with a row: Cf. D1, directly apparent from Fig. 5.
- 2.14 **Claim 6:** A memory is coupled to or incorporated in the controller for storing information about the timing parameter: Cf. D2, c. 5, l. 48-58, the PROM.
- 2.15 **Claim 8:** A display device comprising an electrophoretic display unit as claimed in claim 1 and a storage medium for storing information to be displayed: Cf. D1, the memory 6 in Fig. 2 and par. 49.
3. **Claims fulfilling the requirements of novelty and inventive step**
Claim 7 fulfills the requirements of novelty and inventive step, Art 33(2) and (3) PCT for the following reasons:
- 3.1 The closest prior art according to D1 shows an electrophoretic display unit working with a fixed frame rate and fixed timing of the signals on the electrodes.
- 3.2 The object of the present invention is to reduce optical disturbance from preset data pulses and to increase the number of number gray levels of an electrophoretic display.
- 3.3 This is achieved according to **claim 7** by the provision of an electrophoretic display comprising a display controller delivering driving signals with a variable frame rate, whereby the row driving signals are divided into three parts, each part having a certain purpose in driving the display and each part starting with a fixed or variable delay relative to a frame start.

- 3.4 The provision of the above measure (cf. part 3.3) is not known or rendered obvious by the available prior art. In particular, D1 shows a display unit wherein the timings of the driving signals are fixed, D2 shows a display controller for adapting the frame rate of the display to the frame rate of a video input signal, D3 shows an LC display with a controller which adapts the frame rate to the properties of the input signal and to the temperature, D4 and D5 show electrophoretic displays with fixed timings and fixed frame rates.

Hence, claim 7 fulfills the requirements of novelty and inventive step, Art. 33(2) and (3) PCT.

4. The industrial applicability is given in an obvious manner for the subject-matter of all claims, Art 33(4) PCT.